

## PATENT

What is claimed is:

1           1. A computer readable medium having stored thereon a data structure defining a  
2 physical block (hereafter pblock) in a hierarchy of pblocks which defines the same integrated  
3 circuit structure by reference to data in a netlist which defines a logical hierarchy, the data  
4 defining said pblock comprising:

5                 A) a field or list containing pointers to data defining boundary pins or said  
6 pblock or containing data which defines boundary pins assigned to said pblock, said  
7 boundary pins for connecting to external nets;

8                 B) a field containing a pointer to a parent cellview which contains said pblock;

9                 C) a field containing a pointer to a pcellview data structure owned by said  
10 pblock, said pcellview containing data or pointers to data which define lists of pins,  
11 nets, child pblocks and child instances which have been assigned to said pblock and  
12 which define the functionality of said pblock;and

13                D) a field containing coordinates on a floorplan representing a surface of an  
14 integrated circuit on which said circuits assigned to said pblocks are to be formed,  
15 said coordinates being such as to define a geometric shape representing said pblock  
16 and the size thereof, said geometric shape being displayed on a computer display of  
17 a computer executing a floor planning process.

1           2. The computer readable medium of claim 1 wherein said field or list containing  
2 pointers to data which defines boundary pins or containing data which defines boundary  
3 pins also contains pointers to data which define internal pins of instances contained within  
4 said pblock or contains data which defines said internal pins of instances contained within  
5 said pblock.

1           3. The computer readable medium of claim 1 wherein said data structure includes a  
2 pcellview data structure comprising:

3                 E) a list containing data which defines a list of pblocks which are included or  
4 nested within said pblock defined by data elements A through D;

5                 F) a list containing data or pointers to data on said netlist which define  
6 instances which have been assigned to said pblock;

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7 G) a list containing data or pointers to data which define boundary pins of  
8 said pblock which connect to internal nets of said pcellview;

9 H) a list containing data or pointers to data which define internal physical nets  
10 which connect from boundary pins of said pblock to internal pins so as to complete  
11 the original connectivity between instances defined in said netlist; and

12 I) a field which contains a pointer to a data object representing a parent pblock  
13 that envelopes the pcellview data object defined by data elements E through I.  
14

1 4. A computer readable medium having stored thereon a data structure defining a  
2 physical block cellview (hereafter pcellview) owned by a particular pblock in a hierarchy of  
3 pblocks which defines the internals of said pblock which owns said pcellview, the data  
4 defining said pcellview comprising:

5 A) a list containing data which defines a list of pblocks which are included or  
6 nested within said pblock defined by data elements A through D;

7 B) a list containing data or pointers to data on said netlist which define  
8 instances which have been assigned to said pblock;

9 C) a list containing data or pointers to data which define boundary pins of  
10 said pblock which connect to internal nets of said pcellview;

11 D) a list containing data or pointers to data which define internal physical nets  
12 which connect from boundary pins of said pblock to internal pins so as to complete  
13 the original connectivity between instances defined in said netlist; and

14 E) a field which contains a pointer to a data object representing a parent  
15 pblock that envelopes the pcellview data object defined by data elements A through  
16 E.

1 5. A computer readable medium having stored thereon a data structure defining an  
2 array that links instances from a netlist to pblocks of a physical hierarchy, said array  
3 comprising:

4 a plurality of rows of a one column table, each row having an index that  
5 corresponds to a particular instance from a logical netlist, with the entry in the single  
6 column at that row comprising a field which contains a pointer to a pblock in a

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7 physical hierarchy of pblocks to which is assigned the instance corresponding to  
8 said row.

1 6. A computer readable medium having stored thereon a data structure defining a  
2 floorplan for circuits integrated on an integrated circuit and assigned to physical blocks  
3 (hereafter pblocks) in a physical hierarchy of pblocks, comprising:

4 an array containing:

5 a plurality of rows of a one column table, each row having an  
6 index that corresponds to a particular instance from a logical netlist,  
7 with the entry in the single column at that row comprising a field which  
8 contains a pointer to a pblock in a physical hierarchy of pblocks to  
9 which is assigned the instance corresponding to said row.

10 a field containing an identifier of a root pblock which is a pblock which will  
11 contain all other pblocks in a physical hierarchy of pblocks.

1 7. A computer readable medium having stored thereon a data structure defining a  
2 physical net coupled to instances in physical blocks (hereafter pblocks) in a physical hierarchy  
3 of pblocks, comprising:

4 a field containing a pointer to a parent PCellview to which a physical net  
5 defined by said data structure belongs;

6 a list containing pointers to data objects defining physical boundary pins to  
7 which said physical net is coupled in said physical hierarchy or data directly defining  
8 said boundary pins; and

9 a list containing pointers to data objects of a logical netlist which define logical  
10 netlist pins on instances in said logical netlist to which said physical net is coupled in  
11 said physical hierarchy or data directly defining said logical netlist pins.